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INTRODUCTION.

This REVIEW is based on reports for February, 1890, from 2,209 regular and voluntary observers. These reports are classified as follows: 172 reports from Signal Service stations; 120 reports from United States Army post surgeons; 29 reports of rainfall observations of the United States Geological Survey in Arizona, New Mexico, and Colorado; 1,348 monthly reports from state weather service and voluntary observers; 25 reports from Canadian stations; 176 reports through the Central Pacific Railway Company; 339 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Meteorological Report of the Missouri State Board of Agriculture, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, North and South Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, and Texas, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

CHARACTERISTICS OF THE WEATHER FOR FEBRUARY, 1890.

Well-defined tornadoes were reported in Geneva county, Alabama, on the 7th, and in Talladega and Pickens counties, Alabama, and in Kemper county, Mississippi, on the 27th. Destructive storms prevailed in Fayette, Centre, and Cambria counties, Pennsylvania, on the 7th, and along the New Jersey coast from the 7th to 9th. Severe storms occurred at Gainesville, Tex., and Brownsville, Tenn., on the 25th, and on the 26th destructive storms were reported at Marksville, La., Johnsonville, Tenn,, and Paducah, Ky. Extreme wind-velocities of ninety-six miles per hour were noted at Fort Buford, N. Dak., on the 4th, and at Lexington, Ky., on the 26th. A remarkable hail storm was reported at Livingston, Ala., on the 24th.

The month was warmer than usual, except on the Pacific coast and the adjoining part of the plateau region and over the northern part of the country west of the one hundredth meridian. The departures above the average February temperature varied from 5° to 9° in areas east of the Rocky Mountains, and in north-central Montana and the British Possessions to the northward the month averaged about 10° cooler than usual. On the Pacific coast the departures below the average temperature for February were greatest in northern California, where they exceeded 3°, and at San Diego, Cal., the temperature was slightly above the average. In the Atlantic coast and Gulf states and in areas in the Ohio valley and Tennessee the current month was the warmest February in the history of the Signal Service, and the continued high temperature of this and the preceding two months marks the winter of 1889–'90 as the warmest on record over a greater part of the country east of the Mississippi River. The highest maximum temperature reported was 101° at Cameron, La., on the 25th, and the lowest minimum temperature noted was —46° at Camp Poplar River, Mont., and Fort Pembina, N. Dak., on the 26th. At stations in the Atlantic coast and Gulf states, in the Lake region, Tennessee, the upper Mississippi and Missouri valleys, along the eastern slope of the Rocky Mountains, and in the southern plateau region the maximum temperature was as high or higher, and at stations on the Pacific coast the minimum temperature was as low or lower than previously reported for February. The remarkable cold wave which overspread the Gulf States during the 27th and 28th was attended by the coldest weather of the season in the Southern States, a severe "norther" in Texas, and in Alabama, Mississippi, Louisiana, and Texas by killing frost which nipped fruit buds and greatly damaged early vegetation and crops. The cold wave of the latter part of the month on the north Pacific coast and over the middle and northern plateau regions caused a great loss of stock on the ranges in eastern Oregon and northeastern Nevada.

The precipitation was generally in excess of the average for the month in the Saint Lawrence Valley and thence southwestward to northern Arkansas, in the Lake region, in the middle and northern plateau regions, in Oregon, and along the middle Pacific coast; elsewhere it was generally deficient. The greatest excesses in precipitation were noted in north-central Tennessee, where the rainfall was nearly six inches, and in west-central Oregon, where it was more than four inches at Roseburgh and Eola, and more than five inches at Albany greater than the average precipitation for February. In southeastern Indiana, extreme southern Illinois, Tennessee, extreme north-central Michigan, and northwestern Oregon, the excesses over the February average amounted to more than three inches. The greatest deficiencies in precipitation were noted on the south coast of New England, where, at Block Island, R. I., the total amount for the month was over four inches less than the February average, and the deficiences were more than two inches on the North Carolina coast, thence southward to northern Florida, and thence westward along the Gulf coast to southern Louisiana, in central Illinois, extreme southeastern Arizona, extreme northwestern Washington, and at Los Angeles, Cal. The heaviest monthly precipitation reported was 23.68, at Ellensburgh, Oregon; the monthly precipitation exceeded ten inches in northwestern California, in eastern California between the thirty-eighth and thirty-ninth parallels, along and near the west coast of Oregon, in central Arkansas, central Mississippi, northeastern Alabama, northwestern Georgia, central and southwestern Tennessee, southwestern Kentucky, southwestern Indiana, and extreme western North Carolina; and at stations in central Texas, extreme northern Michigan, northern Nebraska, west-central Colorado, and western Oregon the precipitation was the heaviest ever re-

ported for February. Within an area extending over the northern part of the Panhandle of Texas, and thence westward over northeastern New Mexico, and in south-central New Mexico and extreme western Texas no precipitation was reported; and at stations in southeastern North Carolina, western Florida, south-central North Dakota, southern New Mexico, and southeastern Arizona the precipitation was the least ever reported for February. The greatest depth of snowfall was reported along the line of the Central Pacific Railroad in Placer county, Cal., where it amounted to one hundred and forty-nine inches at Cisco, and the great depth of snow in cuts along the line of the railroad crossing the summit of the Sierra Nevada Mountains caused serious interruption to the train service throughout a greater portion of the month.

Lakes Erie and Huron were reported practically open to navigation during the month. Very destructive floods occurred in western Oregon and northern California during the early part of the month. The rivers were generally above the danger line in the Ohio, Cumberland, Tennessee, and lower Mississippi valleys during the latter part of the month, and great damage was caused by the overflow of streams in Ohio and west-central Kentucky. The Verde and Gila rivers, Arizona, overflowed their banks, and a large storage dam on the Hassayampa River, Arizona, gave way, causing loss of life and destruction of property.

Unusually well-defined and brilliant parhelia were observed at Milwaukee, Wis., during the afternoon of the 16th, and at Era, Idaho, during the morning of the 25th.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for February, 1890, as determined from observations taken daily at 8 a. m. and 8. p. m. (75th meridian time), is shown on chart ii by isobars. The departure of the mean pressure for February, obtained from observations taken twice daily at the hours named from that determined from hourly observations, varied at the stations named below, as follows:

Station.	Departure.	Station.	Departure.
Eastport, Me	+.008	Saint Louis, Mo	+.003
Boston, Mass	+.012	Chicago, Ill	+.005
New York City	+.009	Saint Paul, Minn	+.002
Philadelphia, Pa	+.010	New Orleans, La	−.006
Washington City	+.004	Galveston, Tex	−.002
Savannah, Ga	+.009	Santa Fé, N. Mex	−.012
Buffalo, N. Y	+.012	Denver, Colo	−.004
Detroit, Mich	+.005	Salt Lake City, Utah	−.003
Cincinnati, Ohio	+.007	San Francisco, Cal	−.017
Memphis, Tenn	+.002	San Diego, Cal	−.015

For February, 1890, the mean pressure was highest within an area which extended from the middle Missouri valley northward and northwestward to the Saskatchewan Valley, where it was above 30.15, and where, at Swift Current, N. W. T., a mean reading of 30.24 was reported. The mean values were also above 30.15 along the Atlantic coast between the twenty-seventh and thirty-fifth parallels. From central New England southwestward to the east Gulf coast, in the interior of the country between the Mississippi River and the Rocky Mountains and north of the thirty-seventh parallel, and in west-central California the mean pressure was above 30.10. The mean pressure was lowest on the north Pacific coast, where it fell below 30.00, the lowest mean reading, 29.96, being noted at Fort Canby, Wash., and the mean values fell below 30.00 at stations in the eastern part of the middle plateau.

A comparison of the pressure chart for February, 1890, with that of the preceding month shows but slight changes in the positions of the areas of highest and lowest pressure. There has been an eastward movement of the area of high pressure over the southeastern states, and a decrease in mean pressure of about .15 of an inch at south Atlantic coast stations, and within the area of high pressure central in each month over and north of the middle Missouri valley there has been a decrease in mean pressure of about .10 of an inch from North Dakota to Kansas, and a slight decrease in the Saskatchewan Valley. Within the area of low pressure which occupied the north Pacific coast for each month there has been an increase in mean pressure of more than .10 of an inch. In the preceding month there was a range in mean pressure of more than .45 between the Atlantic and Pacific coasts, and a range of more than .40 between the middle Missouri valley and the Pacific coast, while for the current month the ranges in mean pressure between the Atlantic and Pacific coasts amounted to but .20, and the range between the middle Missouri valley and the Pacific coast varied from .15 to .20. The changes in mean pressure referred to caused a decrease in pressure over the entire country, except on the north Pacific coast; the most marked decrease in pressure being shown over the southeastern part of the country, where the mean pressure for February was more than .15 lower than for the preceding month, while on the north Pacific coast near the mouth of the Columbia River there was an increase in mean pressure of more than .10.

The mean pressure for February, 1890, was generally above the normal at Atlantic coast stations from the Gulf of Saint Lawrence to southern Florida, and in the middle and upper Missouri and Red River of the North valleys; elsewhere it was generally below the normal. The greatest departures above the normal pressure occurred in Nova Scotia, New Brunswick, and over a greater part of New England, where they exceeded .05, and the most marked departures below the normal pressure were noted from Arkansas and Indian Territory southward to the west Gulf coast, and from the north Pacific coast southeastward to northern Nevada and northern Utah, where they were more than .05.

BAROMETRIC RANGES.

The monthly barometric ranges at the several Signal Service stations are shown in the table of miscellaneous meteorological data. The general rule, to which the monthly barometric ranges over the United States are found to conform, is that they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. In February, 1890, the monthly ranges were greatest over extreme eastern New England, where they exceeded 1.50, whence they decreased southward to less than .30 over southern Florida, westward to less than 1.15 in the upper Missouri valley, from which region they increased to more than 1.35 in the upper valley of the Columbia River, and thence decreased to 1.20 on the north Pacific coast. Along the Atlantic coast the monthly ranges varied from .27 at Key West, Fla., to 1.53 at Eastport, Me.; between the eighty-second and ninety-second meridians, .46 at Cedar Keys, Fla., to 1.35 at Sault de Ste. Marie, Mich.; between the Mississippi River and the Rocky Mountains, .71 at Corpus Christi, Tex., to 1.23 at Bismarck, N. Dak.; in the Rocky Mountain and plateau regions, .47 at Fort Grant, Ariz., to 1.38 at Spokane Falls, Wash.; on the Pacific coast, .42 at San Diego, Cal., to 1.20 at Fort Canby, Wash.

AREAS OF HIGH PRESSURE.

Nine areas of high pressure were observed during the month of February, four of which first appeared in the regions north of North Dakota and Montana; three approached from the north Pacific coast; and two from the Hudson Bay region. Seven of these areas of high pressure were traced eastward to the Atlantic coast, the general direction of movement being slightly to the south of east; two disappeared by gradual decrease of pressure west of the Mississippi. Those areas of high pressure observed on the Pacific coast were apparently moving in a northeasterly direction when first observed, but after passing to the east of the coast line the direction of